

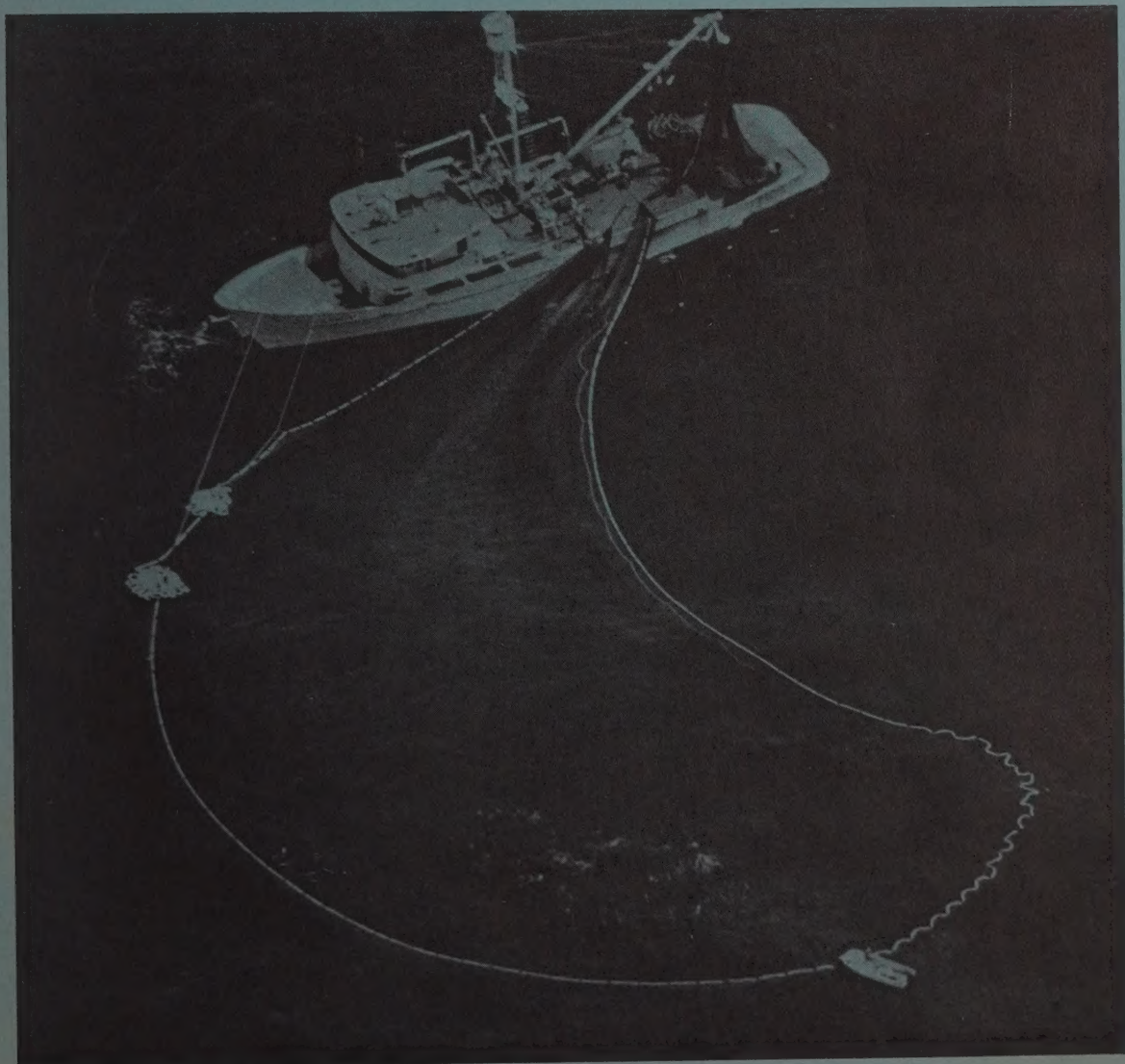
J-77-13

Southwest Fisheries Center
Administrative Report No. LJ-77-13

Methods of Reducing Porpoise Mortality in the Yellowfin Tuna Purse Seine Fishery

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METHODS OF REDUCING PORPOISE MORTALITY IN THE YELLOWFIN TUNA PURSE SEINE FISHERY

by

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Introduction

The Marine Mammal Protection Act of 1972 and subsequent regulations promulgated by the National Marine Fisheries Service, as mandated by that statute, require that the yellowfin tuna purse seine fishery reduce serious injury and mortality rates of porpoise to insignificant levels approaching zero.

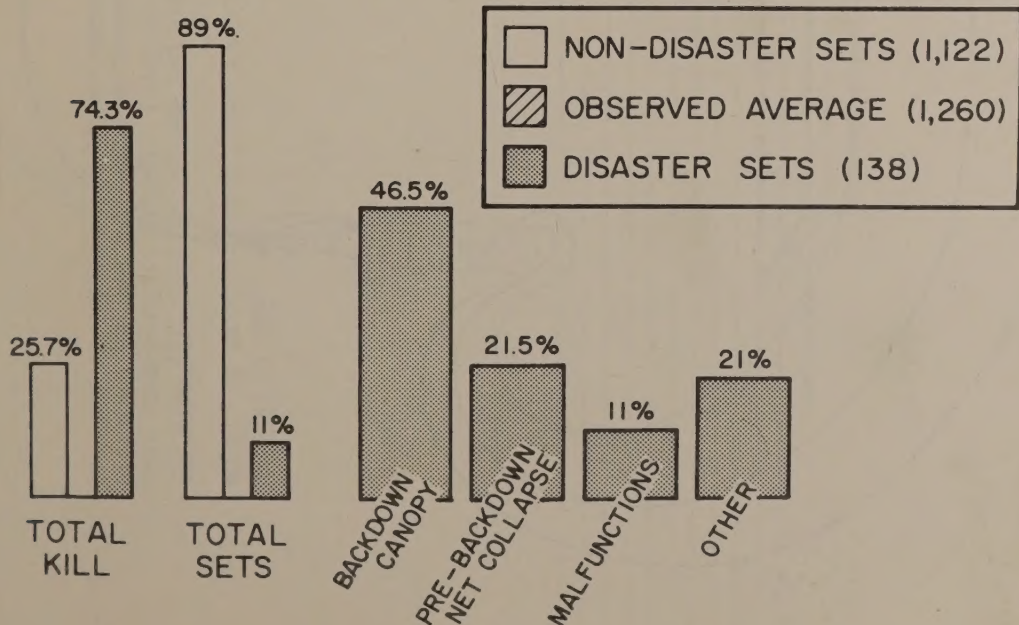
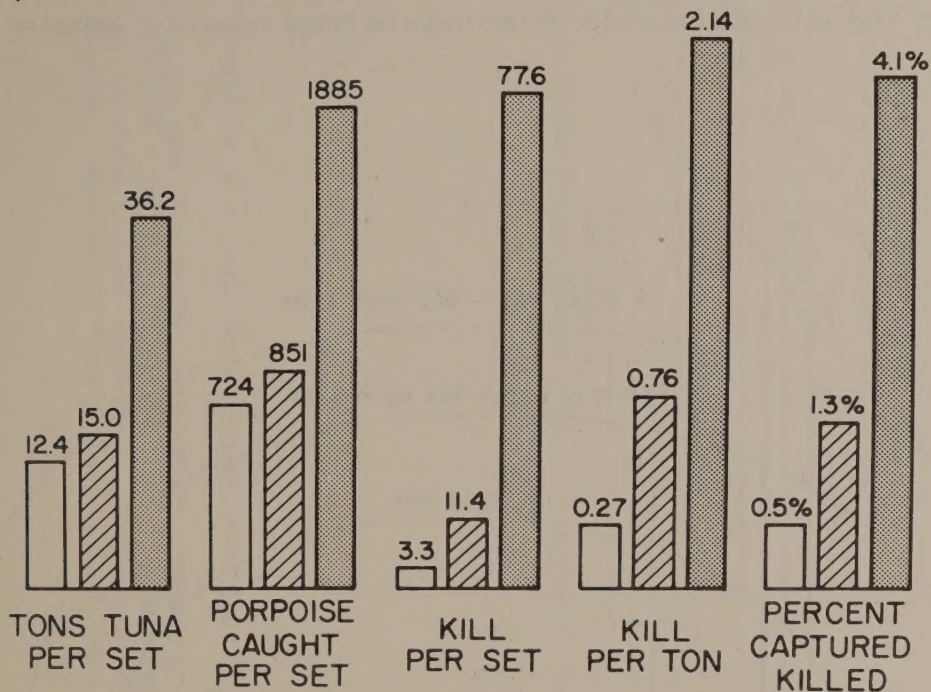
In 1976, a mass test of advanced seining technology, jointly funded by the tuna industry and the National Marine Fisheries Service produced data suggesting that extremely low mortality rates might be an obtainable objective. The promising technology tested involved significant changes in (1) net design, (2) operational procedures and (3) rescue techniques during and after backdown. Most of the operational difficulties experienced by the test vessels have been identified and countermeasures for improvement have been proposed. Moreover, a cursory examination of the data suggests that an economic advantage may accrue to vessels using the new gear and methods.

Concurrent with the mass test, a study of 1976 high mortality sets (disaster sets - see Figure 1) experienced by both test vessels and vessels using existing technology suggest that a significant reduction of total mortality could be accomplished by elimination of the major causes of disaster sets. For example, it was found that 74% of the observed kill for 1976 occurred in only 11% of the observed sets (1297 sets observed). Study of these disaster sets provided much useful information on the causes of mortality and indicated corrective measures that might be taken to reduce the incidence of high mortality sets.

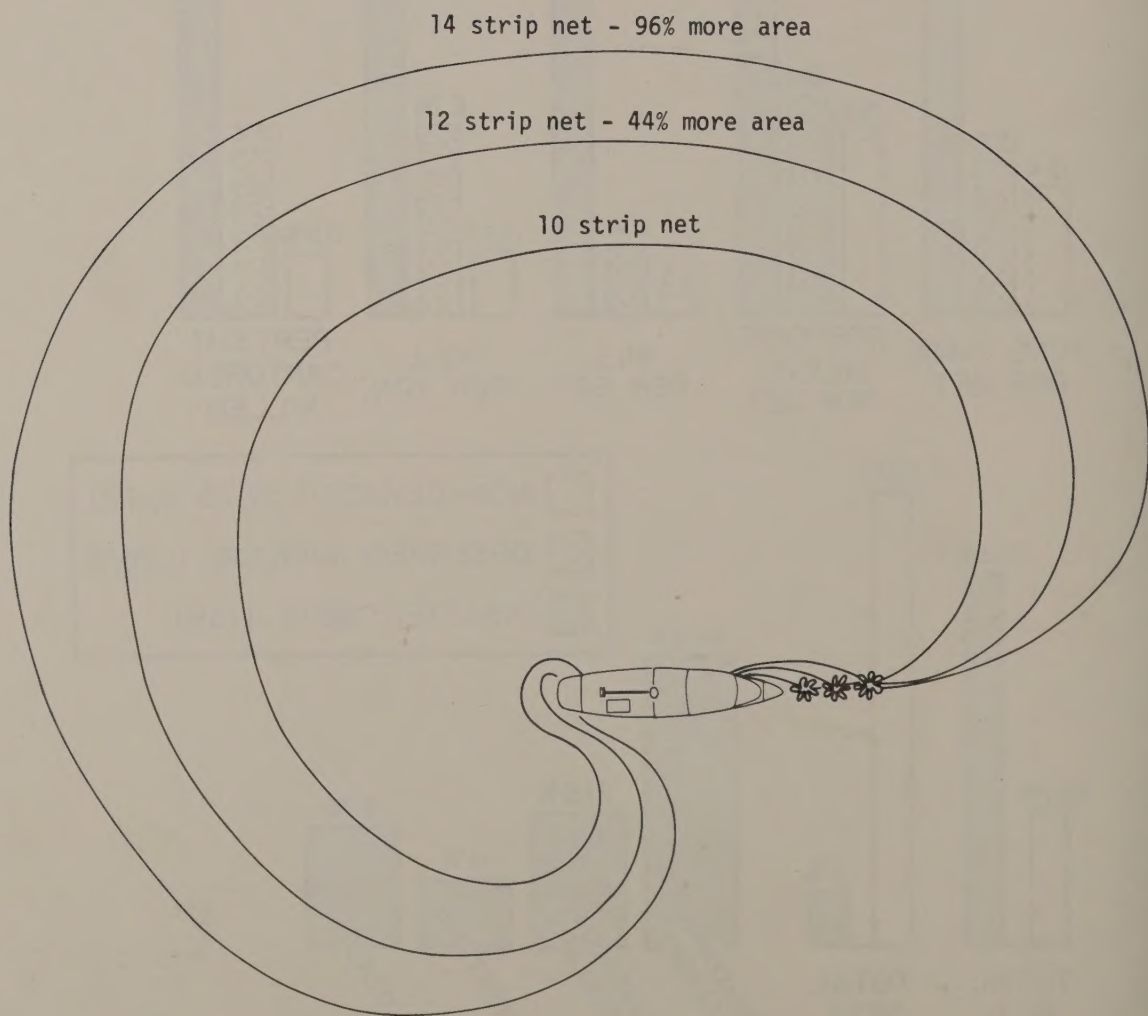
It is therefore the intent of this article to provide an illustrated list of "do's and don'ts" which might serve to eliminate many of the preventable causes of disaster sets. It is recognized that many variables occur during the fishing operation which might tend to modify some of the procedures depicted. For example, lack of a bow thruster, adverse porpoise behavior and sudden changes in wind velocity can affect the methodology employed. However, the following do's and don't's serve as a general guideline and should be followed whenever possible.

1976 DISASTER SET STUDY

(SETS IN WHICH MORE THAN 25 PORPOISE WERE KILLED)

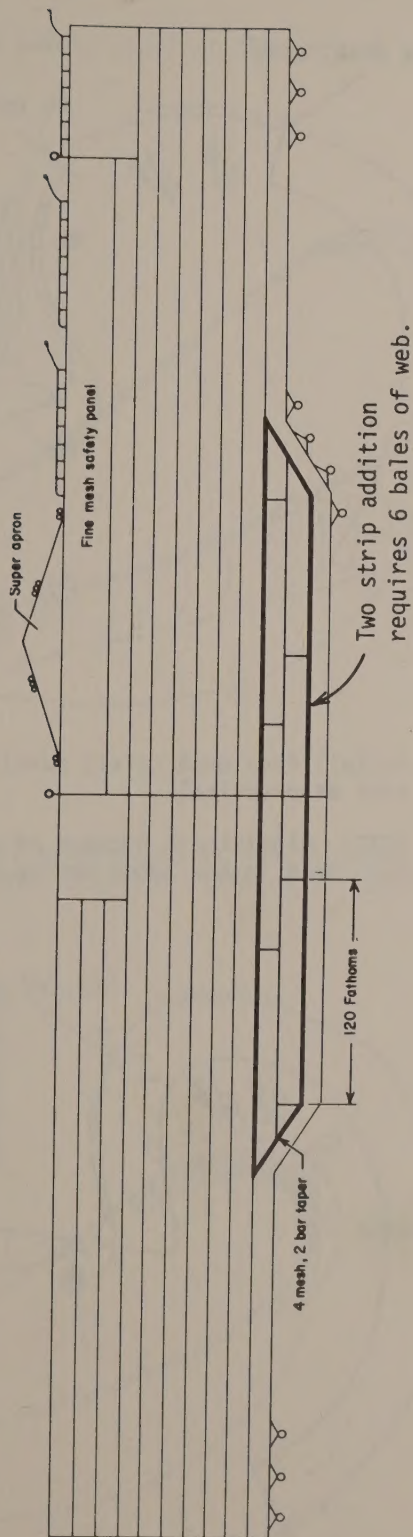


1. Don't fish with shallow (9-10 strips) nets on large schools of porpoise.

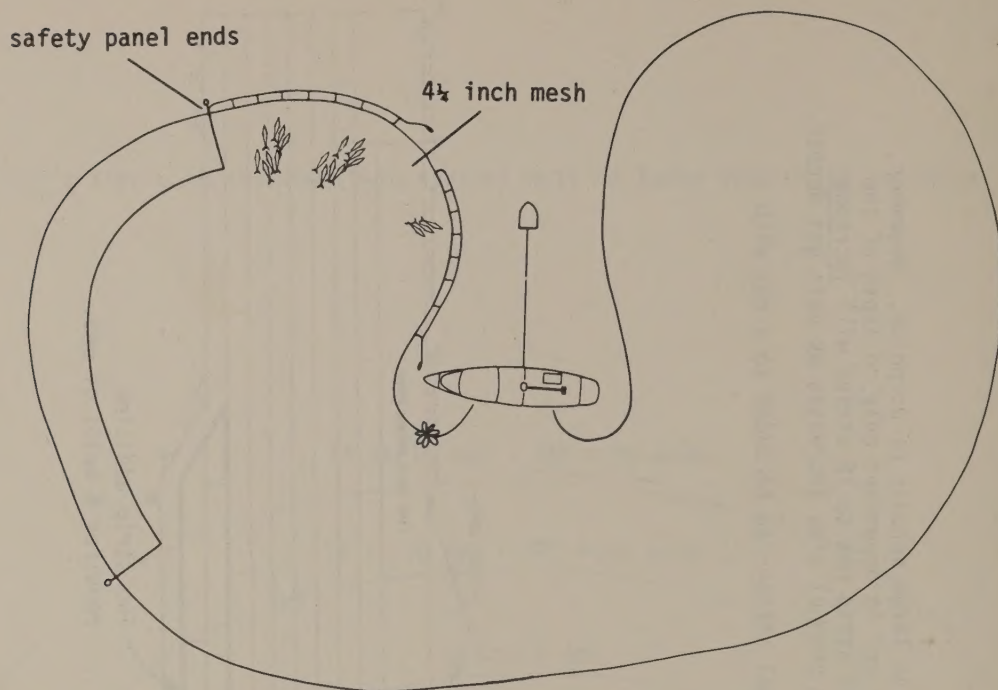


1. Do use deep as possible (12-14, or more strips) nets on large schools of porpoise. Remember, area (and volume) available for porpoise at "rings up" is dependent only on depth of the net, regardless of length. Example: Changing a 10 strip net to 12 strips will increase its area 44%. Length, volume and area of backdown channel also increases as nets get deeper.

NOTE: By using a 4 mesh 2 bar taper, TWO additional strips can be added to a net with 6 bales of web!

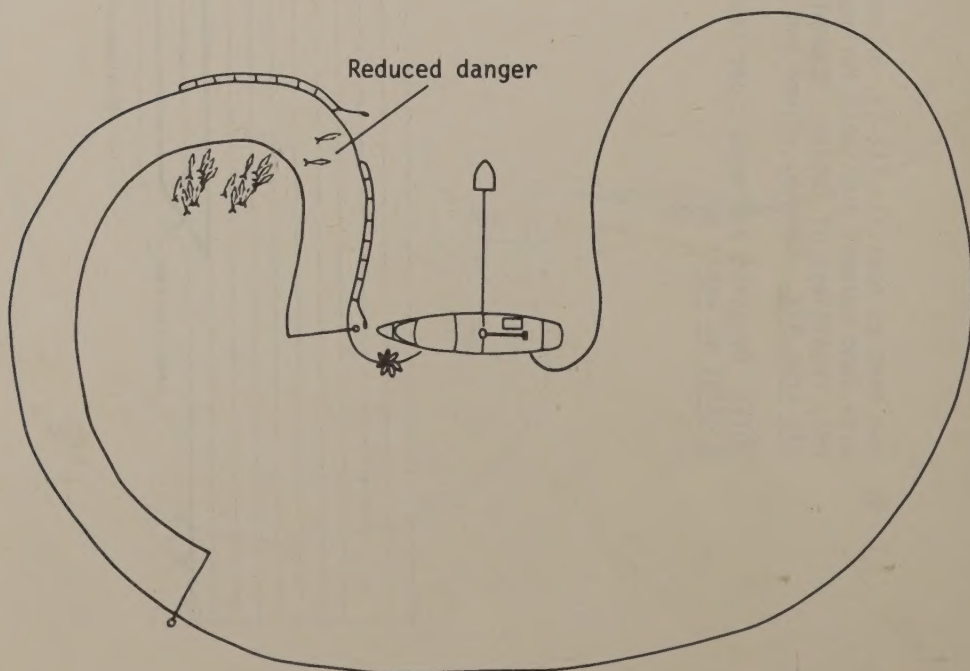


2. Don't install fine mesh safety panels (Medina panels) only from outboard of last bunch pulled.

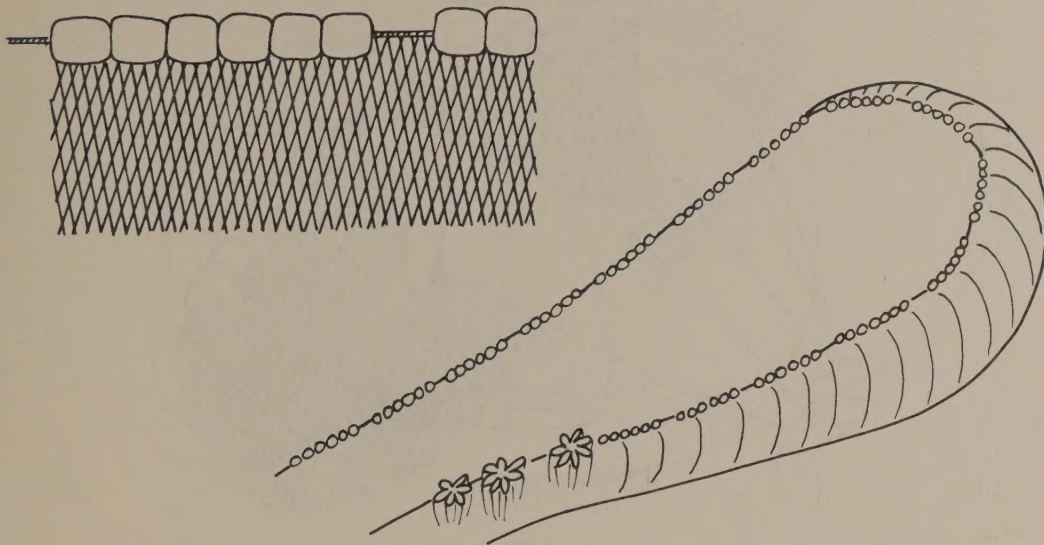


Do install fine mesh safety panels through the bunches as near to the sack as practical.

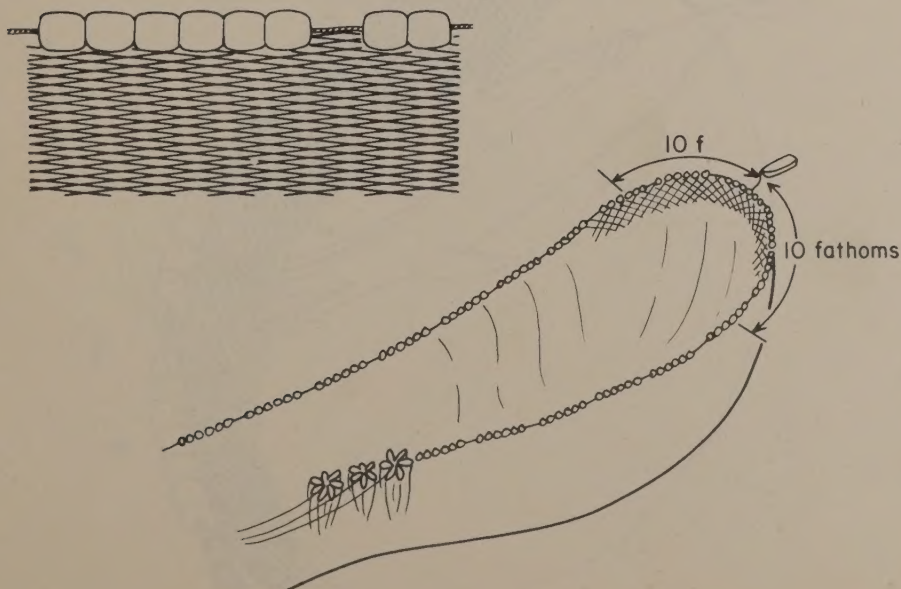
NOTE: Significant numbers of porpoise become entangled in 4 1/4-inch mesh in bow bends before all bunches are pulled!



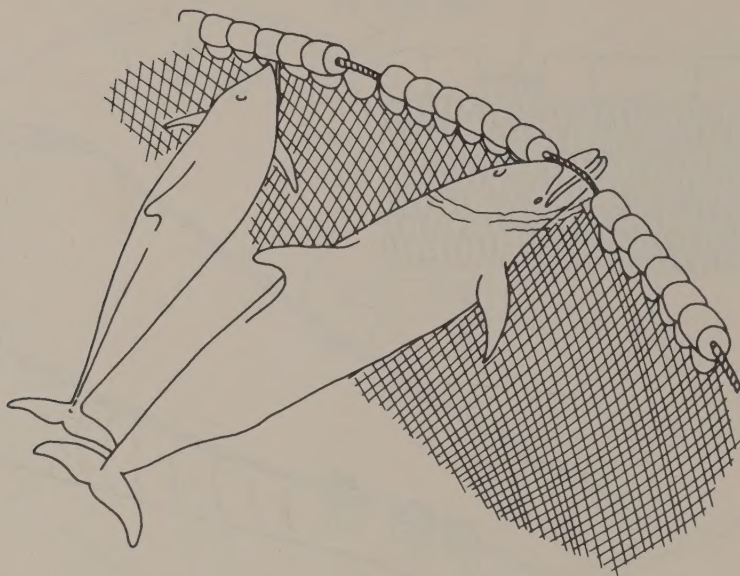
3. Don't hang-in meshes of fine mesh safety panel at the apex of the back-down channel.



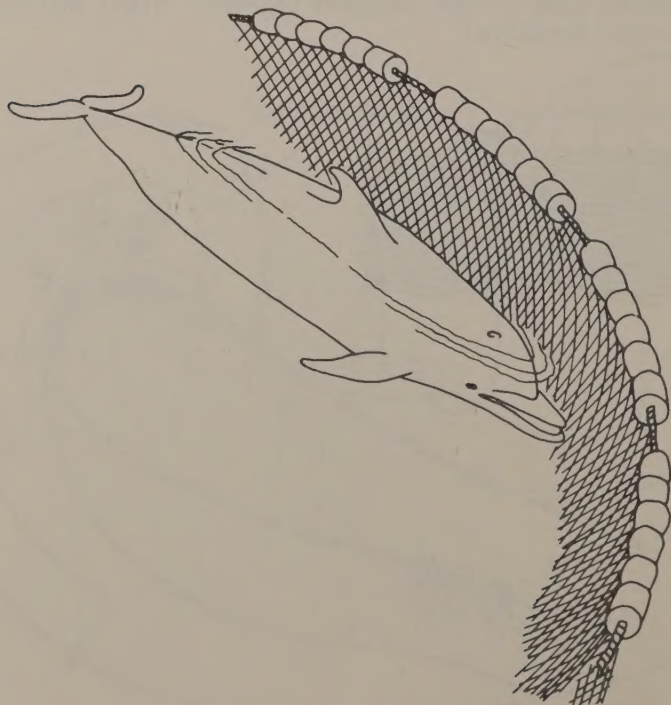
- Do hang safety panel meshes as tight (stretched) as possible for 20 fathoms around apex of the backdown channel. Tight web significantly reduces canopy formation.



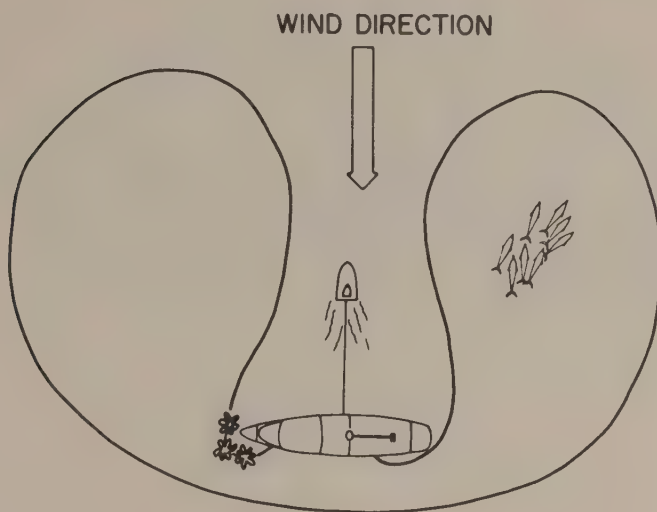
4. Don't use loose hangings under corks in backdown area.



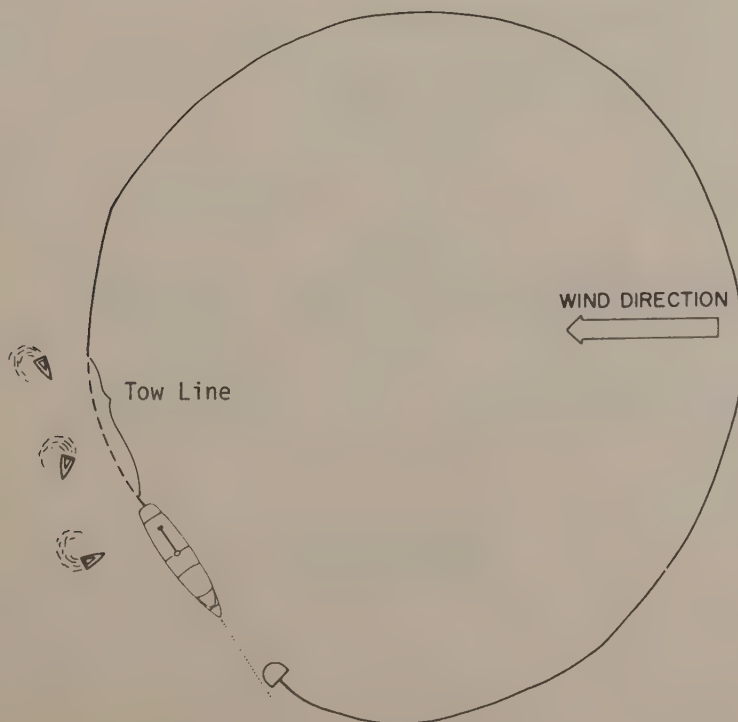
- Do keep all hangings tight, particularly in hand-hold areas.



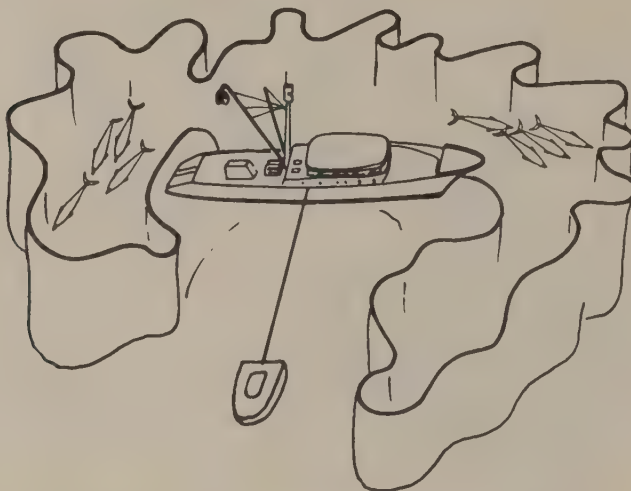
5. Don't make downwind sets. Wind and current can push the boat into the net resulting in a net collapse.



Do set after turning upwind 45° from having wind on the port beam.



6. Don't wait until collapse of net is eminent before hooking up speedboats to hold the net open. It is almost impossible for speedboats to re-open a collapsed net.



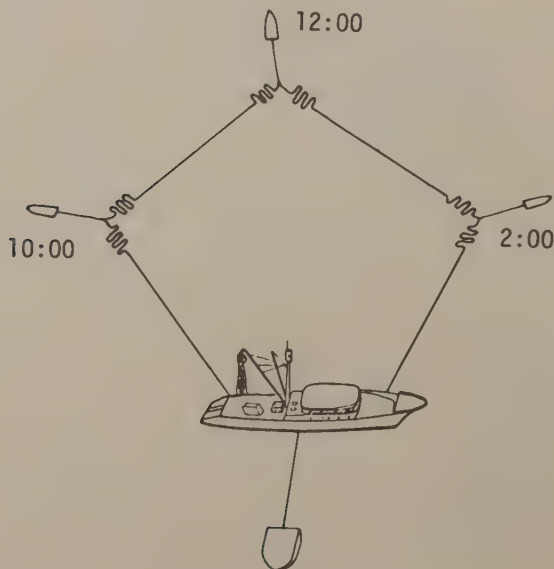
Do hook-up and pull with speedboats routinely whenever a large number of porpoise are in the net.

Examples of routine speedboat use:

500-1000 porpoise--one speedboat at 10 o'clock

1000-2000 porpoise--one speedboat at 10 o'clock, one at 12 o'clock

2000 or more porpoise--one speedboat at 10 o'clock, one at 12 o'clock and one at 2 o'clock



7. Don't regulate number of bunches pulled by amount of fish expected.

Do pull same number of bunches every set regardless of the amount of fish. Extra bunches may be pulled if needed after all porpoise are out.

8. Don't be overly optimistic of the amount of time it takes to clear a gear malfunction.

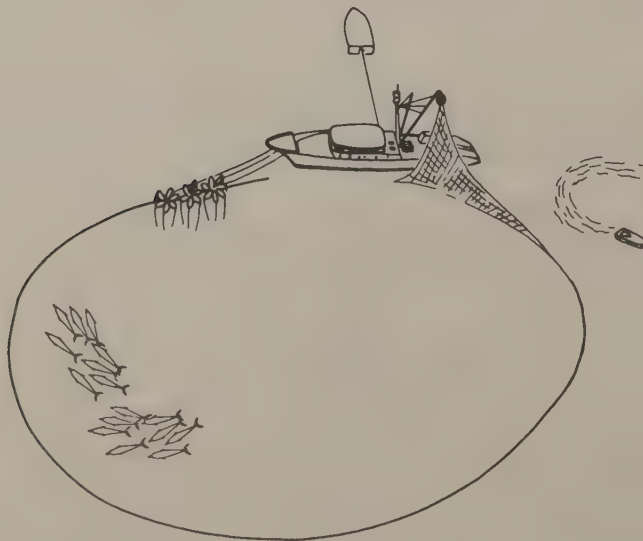
Do immediately hook-up speedboats for towing even during minor malfunctions. "Little" problems often take much longer to correct than anticipated resulting in unnecessary net collapse.

NOTE: In this study approximately 21% of the mortality was due to net collapse before backdown.

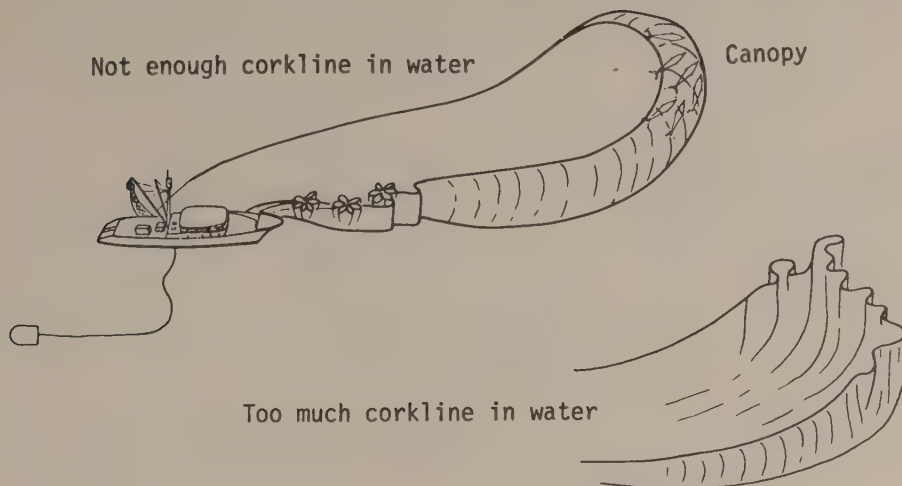
9. Don't haul net without a speedboat circling outside net where corks are coming out of water on the way up to power block. Open 4-1/4-inch mesh, provides a weak sonar target for porpoise which may become entangled if they approach this area.



- Do use one speedboat to prevent animals from charging this area while searching for an escape route. Remember, corks make good sonar targets while 4-1/4-inch mesh is nearly "invisible" to the porpoise's sonar.



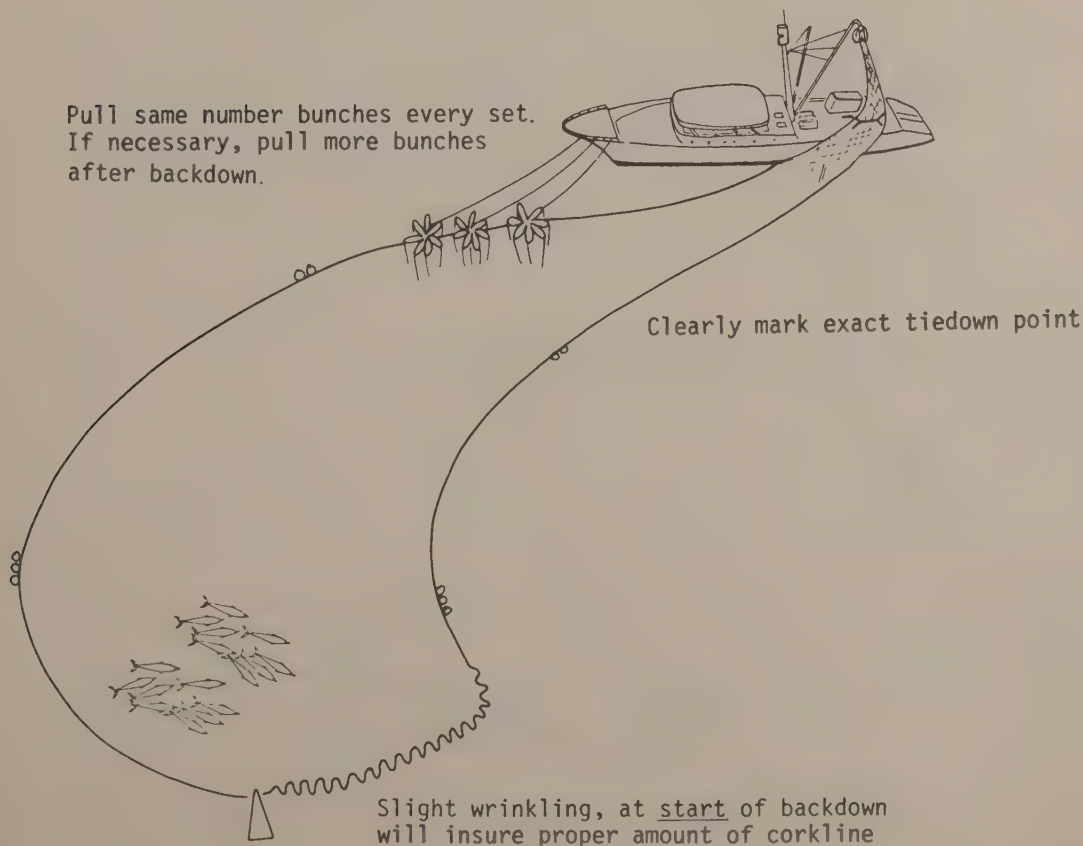
10. Don't estimate proper tie down points for net and last bunch pulled.



Do clearly mark all tie-down points that provide a slight wrinkle of corkline at apex of the backdown channel. If pulling a variety of number of bunches is anticipated, have all possible situations clearly marked.

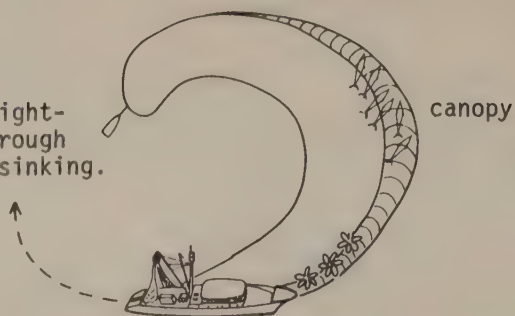
NOTE: Too little corkline in the water results in a backdown canopy. In this study, nearly one-half of the observed mortality occurred in backdown canopies.

Pull same number bunches every set.
If necessary, pull more bunches
after backdown.

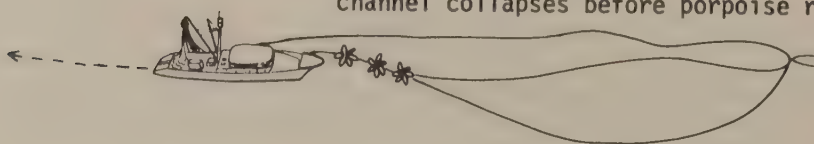


11. Don't backdown in too tight of a circle or too great an arc.

Backdown radius too tight-
reduced water flow through
apex prevents proper sinking.



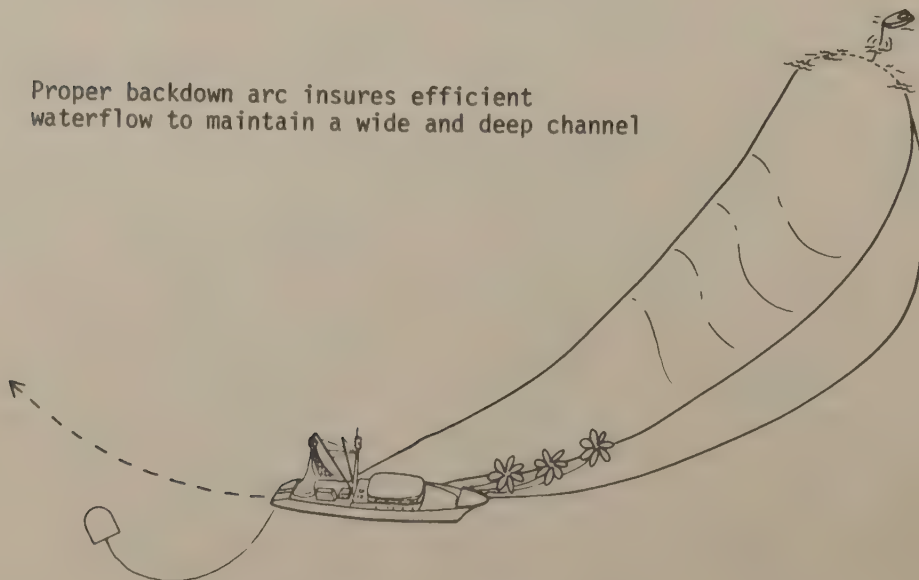
Backdown arc too great-
channel collapses before porpoise release.



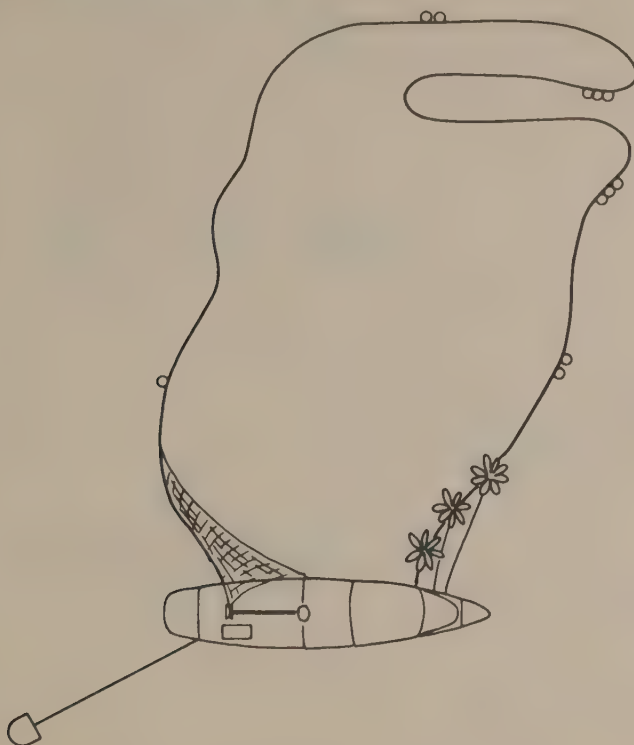
Do maintain correct radius of turn by frequently changing (1) position of skiff, (2) position of rudder, and (3) direction of thruster.

Examples: a) start with skiff towing from stern position as much abeam as possible, rudder hard right and thruster pushing bow into net, b) as backdown channel becomes well developed, place skiff astern, rudder in center and thruster as needed to maintain good rate of turn, and c) when channel gets too much off the bow, increase the rate of turn by having skiff cross over stern, use full left rudder and thruster to regulate rate of turn as relative direction of wind changes.

Proper backdown arc insures efficient
waterflow to maintain a wide and deep channel



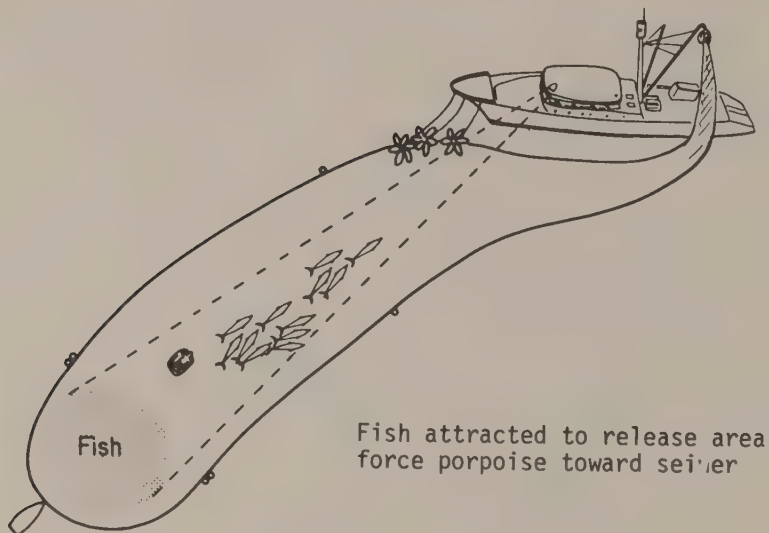
12. Don't attempt backdown with a net having a tapered web "apron" or "apron-chute" (Bold Contender system) complex whenever the backdown channel apex is folded inside the net.



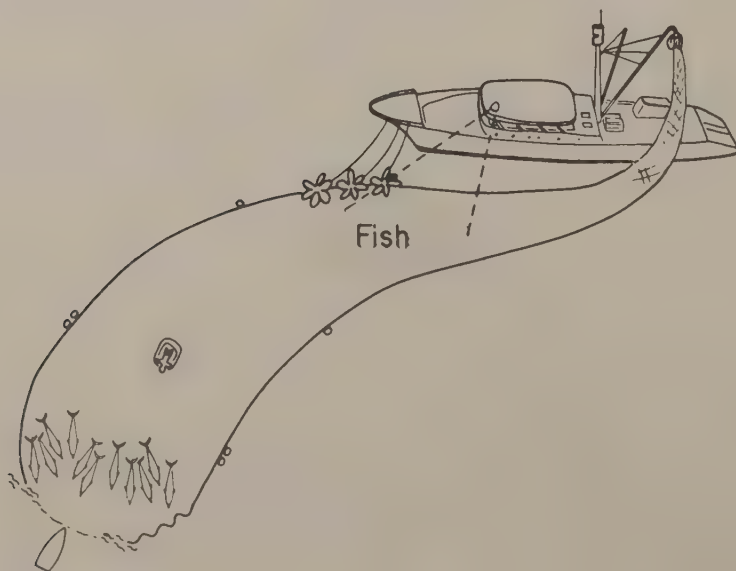
- Do use a speedboat to pull out the collapsed apex section before backdown (it only takes a minute).



13. Don't shine spotlight at apex of corkline during night time backdowns (except intermittent flashes). This will attract fish to the release area and force the porpoise back toward the seiner.



- Do shine floodlight or spotlight between bunches and the seiner to attract and hold fish. Use a hand-held spotlight to occasionally check backdown progress.



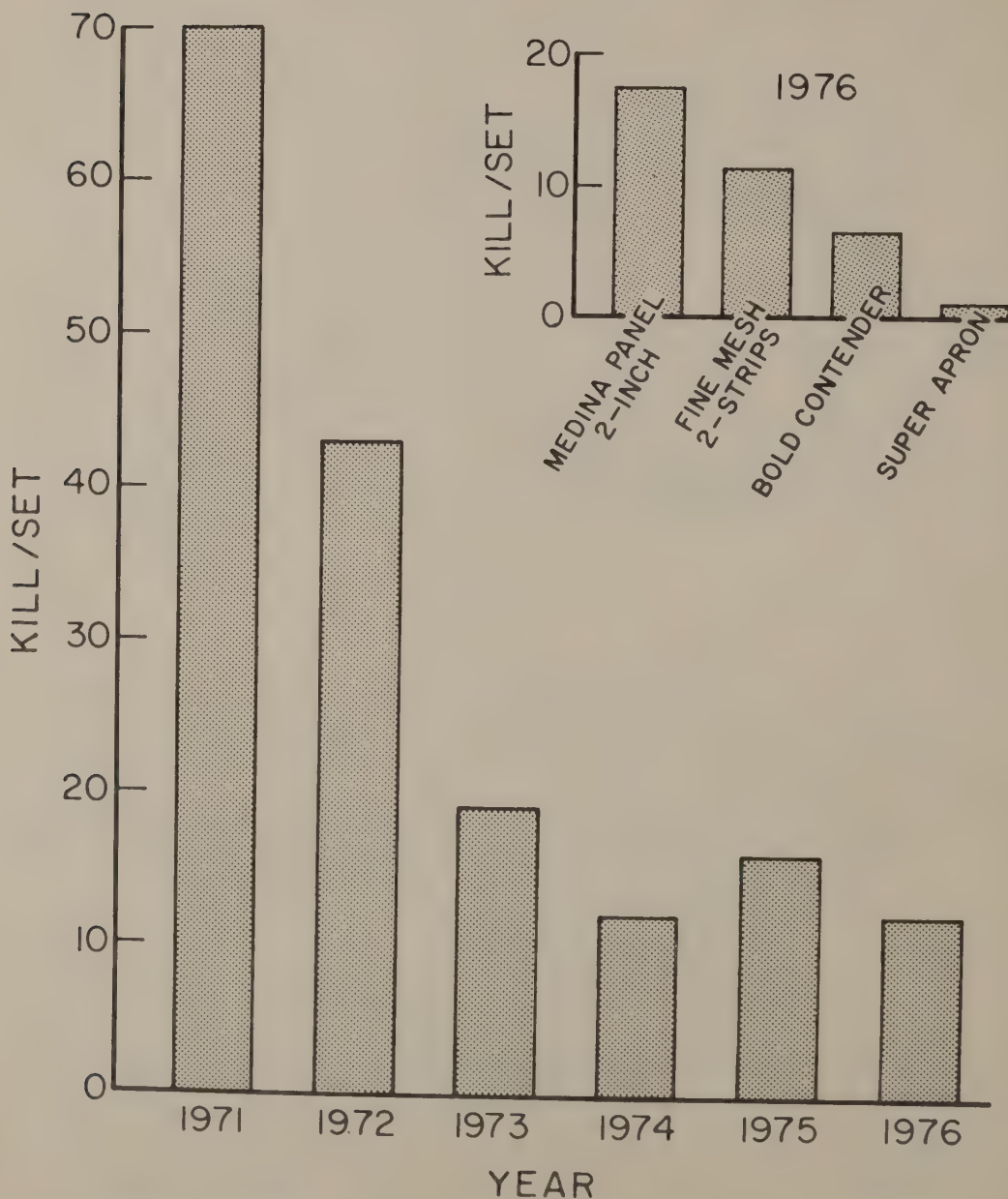
14. Don't stop backing down until all porpoise are out of the net.



Do continue rescue using one man, with face mask, in a small rubber raft to check for "sleepers" resting on bottom of net and to help reluctant animals over corks. The "man-in-a-raft" is in addition to the normal use of the speedboats tending backdown.



15. Don't assume that releasing 99% of all porpoise is good enough.



Do realize that 1% of all porpoise captured by the U.S. fishing fleet can exceed the quota needed to insure the stability and well being of porpoise populations. Strive for zero on every set.

NOTE: The MMPA requires that mortality be reduced to a level "approaching zero." The apron-chute (Bold Contender system) and super apron, when used with the preceding Do's and Don't's have demonstrated that 99.98 percent of all captured porpoise can be released alive.

NOTES

